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(54) Parting drum for axially spacing two coaxial cigarette portions on a filter assembly machine

(57) On a filter assembly machine (1), two coaxial cigarette portions (5a, 5b), initially contacting each other end to end, are parted by a parting drum (2), wherein a rotary conveyor (8) for pairs (4) of cigarette portions (5) is mounted for rotation on a cam drum (17), and has at least one pair of cigarette portion holder slides (10) moved axially in opposite directions along the rotary conveyor (8) by the cam drum (17); the distances between the slides (10) at a pickup station (3) and a release station (7), where the cigarette portions (5) are picked up and released respectively, is adjusted by adjusting an angular position of the cam drum (17) with respect to the pickup station (3) and the release station (7).

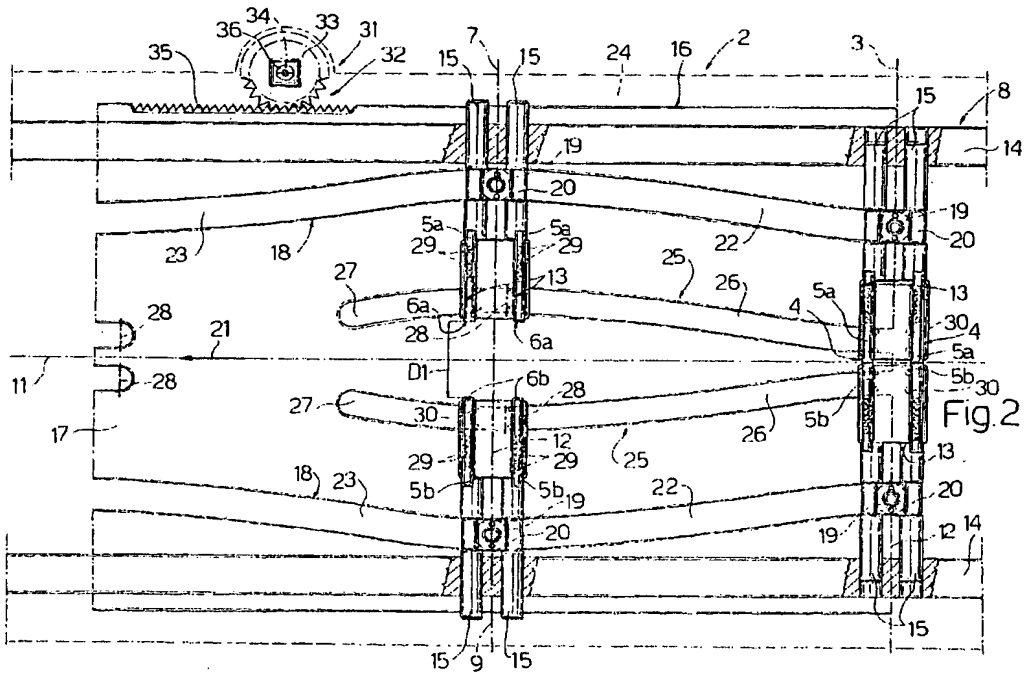

Fig.2

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Description

[0001] The present invention relates to a parting drum for axially spacing two coaxial cigarette portions on a filter assembly machine.

[0002] In the manufacture of filter-tipped cigarettes, pairs of cigarette portions are fed successively to a parting drum at a pickup station. The pairs of cigarette portions - each comprising two coaxial cigarette portions normally contacting each other end to end - are fed successively on the parting drum to a release station, and, as they travel between the pickup and release stations, the cigarette portions in each pair are spaced a given distance apart to permit insertion of a double filter between the two cigarette portions.

[0003] At later manufacturing stages, each group defined by two coaxial cigarette portions and by a respective double filter is formed into a double cigarette by rolling a band about the double filter and part of the two respective cigarette portions, and each double cigarette so formed is cut in half to form two coaxial, oppositely-oriented filter-tipped cigarettes.

[0004] One known type of parting drum comprises a rotary conveyor having at least one pair of slides, each having at least one groove or seat coaxial with a corresponding seat on the other slide. Each of the two seats receives a respective cigarette portion, and the respective slides are mounted to move axially in opposite directions along the rotary conveyor under the control of a cam drum, on which are formed cylindrical cams, each engaged by a tappet roller connected to a respective slide.

[0005] The above known parting drum fails to provide for adjusting the distance by which the two cigarette portions are spaced, i.e. for varying the size of the filter-tipped cigarettes being produced, which can therefore only be done by changing the cam drum, in itself a painstaking job.

[0006] It is an object of the present invention to provide a parting drum designed to eliminate the aforementioned drawback and to permit fast changes in size in a relatively straightforward, low-cost manner.

[0007] According to the present invention, there is provided a parting drum for axially spacing two coaxial cigarette portions on a filter assembly machine, the parting drum comprising a rotary conveyor rotating about a first axis; at least one pair of cigarette portion holder elements, each for receiving at least one respective said cigarette portion, said cigarette portion holder elements being carried by said rotary conveyor coaxially with each other along a second axis parallel to said first axis, and being movable, with said rotary conveyor, with a given first law of motion and about said first axis, through a pickup station where the respective said cigarette portions are picked up, and through a release station where the cigarette portions are released; and actuating means for imparting to said cigarette portion holder elements a relative movement, with respect to each other, along said second axis and with a given second law of motion; and being characterized by comprising adjusting means for adjusting the timing of said second law of motion with respect to said first law of motion about said first axis.

[0008] A non-limiting embodiment of the present invention will be described by way of example with reference to the accompanying drawings, in which:

Figure 1 shows a spreadout view, with parts removed for clarity, of a preferred embodiment of the parting drum according to the present invention and in two different operating positions;

Figures 2 and 3 show larger-scale views of respective parts of Figure 1.

[0009] Number 1 in Figure 1 indicates as a whole a filter assembly machine, which comprises a parting drum 2 for receiving, at a pickup station 3, a succession of pairs 4 of cigarette portions 5 - each pair 4 comprising two coaxial cigarette portions, hereinafter indicated 5a and 5b, contacting each other end to end at ends 6, hereinafter indicated 6a and 6b - and for axially spacing cigarette portions 5a and 5b in each pair 4 so as to release them, at a release station 7, with ends 6a and 6b spaced a given distance D apart.

[0010] The example shown relates to a particular drum 2 for receiving pairs 4 of cigarette portions 5 in twos.

[0011] Though drum 2 is designed to simultaneously retain a number of pairs of pairs 4 of cigarette portions 5, reference will be made in the following description to one pair of pairs 4 of cigarette portions 5 for the sake of simplicity.

[0012] Drum 2 comprises a rotary conveyor 8 rotating about an axis 9 and supporting, along its periphery, a pair of slides 10, which are located on opposite sides of a plane of symmetry 11, perpendicular to axis 9, of conveyor 8, and are aligned along an axis 12 parallel to axis 9 and movable, with conveyor 8 and with a first law of motion, along an annular path extending through pickup station 3 and release station 7.

[0013] Here and hereinafter, the term "first law of motion" is intended to mean not only the way in which the angular speed - in the example shown, the constant angular speed - of conveyor 8 varies with time, but also the timing by which a given point of conveyor 8 - in the example shown, axis 12 - travels through pickup station 3 and release station 7.

[0014] Each slide 10 comprises two longitudinal seats 13, each of which is parallel to respective axis 12, receives and retains a respective cigarette portion 5, in known manner by suction, between pickup station 3 and release station 7, and is aligned axially with a corresponding seat 13 on the other slide 10.

[0015] Conveyor 8 comprises two collars 14 coaxial with axis 9 and angularly integral with each other by means of a known connecting device not shown. Each

collar 14 is fitted through with two axially-sliding guide rods 15, which, together with slides 10, form part of conveyor 8 and extend parallel to axis 12. Rods 15 in each pair are coaxial with respective rods 15 in the other pair, are located on opposite sides of and symmetrically with respect to axis 12, and integrally support a respective slide 10.

[0016] As conveyor 8 rotates, each slide 10 is moved, together with respective rods 15 and by means of an actuating device 16, along axis 12 with a second law of motion and in the opposite direction to the other slide 10. Actuating device 16 forms part of drum 2, and comprises a tubular cam drum 17 coaxial with and supporting conveyor 8, and maintained, in use, in an angularly fixed position.

[0017] Here and hereinafter, the term "second law of motion" is intended to mean not only the way in which the speed of slides 10 along axis 12 varies with time, but also the timing of the slides with respect to said first law of motion, i.e. the position assumed instant by instant by slides 10 along axis 12 as slides 10 travel about axis 9 between pickup station 3 and release station 7.

[0018] The second law of motion is defined by two annular grooves, which are formed on the outer surface of cam drum 17, extend about axis 9, and define respective cams 18 located specularly with respect to the plane of symmetry 11, and each associated with a respective slide 10.

[0019] Each cam 18 is associated with respective slide 10 by means of a respective tappet roller 19, which forms part of actuating device 16 and is connected to a respective U fastener 20 integral with the respective pair of rods 15.

[0020] Each cam 18 is sinusoidal, and comprises - with reference to the plane of symmetry 11 and in the rotation direction of rotary conveyor 8 indicated by arrow 21 - a diverging portion 22 and a converging portion 23. Diverging portion 22 extends between a point at a minimum distance and a point at a maximum distance from plane 11, and is subtended by a center angle substantially equal to that between pickup station 3 and release station 7.

[0021] In a variation not shown, only one of slides 10 is movable along axis 12 and associated with a cam 18, the other slide 10 being fixed.

[0022] Parting drum 2 also comprises a known fixed cylindrical distributor 24 coaxial with and housed inside cam drum 17. Distributor 24 cooperates with cam drum 17 via two through slots 25 formed through cam drum 17 along portions 22 of respective cams 18 and along respective arcs, each of which extends about axis 9 and through pickup station 3 and release station 7. Slots 25 are located specularly with respect to plane of symmetry 11, and each extend parallel to the cam 18 on the same side of plane of symmetry 11. Each slot 25 comprises two portions 26 and 27; portion 26 extends through pickup station 3 and defines the end branch of a suction circuit extending through distributor 24; portion 27 extends through release station 7 and defines the end branch of an exhaust connected to the atmosphere; and each portion 26 is separated from the respective portion 27 by a known movable fluidtight partition 28.

[0023] Each slide 10 comprises holes 29 formed at each seat 13; and holes 30, which communicate in known manner (not shown) with holes 29, and, as slide 10 moves, continue communicating with respective slot 25, where this is present.

[0024] As it travels about axis 9, each seat 13 is therefore connected to respective slot 25, so as to receive and retain respective cigarette portion 5 by suction along portion 26, and release the cigarette portion along portion 27 of slot 25.

[0025] On parting drum 2, the angular position of cam drum 17 with respect to pickup and release stations 3 and 7, and therefore the timing of said second law of motion with respect to said first law of motion, can be adjusted by means of an adjusting device 31, which comprises a rack-and-pinion coupling 32 defined by a pinion 33 fitted to an end portion of distributor 24 and rotating about a fixed axis 34 perpendicular to axis 9, and by a rack 35 formed on one end of cam drum 17. Pinion 33 has a central lock screw 36 for angularly locking cam drum 17 in the set position.

[0026] In actual use, as rotary conveyor 8 rotates at substantially constant angular speed about axis 9 in the direction of arrow 21, slides 10 are moved along a circular path through pickup station 3, where one slide receives a pair of cigarette portions 5a, and the other slide a pair of cigarette portions 5b, and where each cigarette portion 5a is coaxial with the respective cigarette portion 5b, and positioned with end 6a facing and contacting end 6b of cigarette portion 5b. In the example shown, the two contacting ends 6a and 6b are located, at pickup station 3, at the plane of symmetry 11 of rotary conveyor 8.

[0027] As slides 10 continue moving towards release station 7 in the direction of arrow 21, respective tappet rollers 19 engaging cams 18 move slides 10 along axis 12 so as to separate each end 6a from respective end 6b by a distance eventually equal to a value D at release station 7.

[0028] As shown in Figure 1, adjusting device 31 provides for setting diverging portions 22 of the two cams 18 to any position ranging between two limit positions shown in the top and bottom halves of Figure 1 and corresponding to two limit values D1 and D2 of distance D. More specifically, as shown in Figure 2 and in the top half of Figure 1, the maximum value D1 of distance D is achieved by positioning the start and end of portions 22 of cams 18 at pickup station 3 and release station 7 respectively.

[0029] In terms of the stress applied to cigarette portions 5 at pickup and release stations 3 and 7, the Figure 2 setting is the best, by the speed of slides 10 being substantially zero in the direction of axis 12 at both stations.

[0030] Conversely, as shown in Figure 3 and in the bottom half of Figure 1, portions 22 of cams 18 are offset with respect to the arc extending between pickup and release stations 3 and 7, so that pickup station 3 is located at an intermediate point of portions 22 of cams 18, and the final distance D2 between ends 6a and 6b at release station 7 is smaller than distance D1, due to tappet rollers 19 traveling not only along a shorter portion of portions 22 of respective cams 18, but also along an initial portion of respective portions 23.

[0031] The sinusoidal shape of cams 18, and the fact - in itself not an essential feature - that the length of portions 22 is substantially equal to the arc between pickup and release stations 3 and 7, therefore provide for obtaining a relatively high D1-D2 value with relatively small timing adjustments of portions 22 with respect to pickup and release stations 3 and 7, and therefore with relatively small timing adjustments of said first and second law of motion. In other words, distance D is adjusted between D1 and D2 with pickup and release stations 3 and 7 located close to the respective ends of portions 22 of cams 18, i.e. in positions in which the speeds of slides 10 in the direction of axis 12 are close to zero.

Claims

1. A parting drum for axially spacing two coaxial cigarette portions on a filter assembly machine, the parting drum (2) comprising a rotary conveyor (8) rotating about a first axis (9); at least one pair of cigarette portion holder elements (10), each for receiving at least one respective said cigarette portion (5), said cigarette portion holder elements (10) being carried by said rotary conveyor (8) coaxially with each other along a second axis (12) parallel to said first axis (9) , and being movable, with said rotary conveyor (8), with a given first law of motion and about said first axis (9), through a pickup station (3) where the respective said cigarette portions (5) are picked up, and through a release station (7) where the cigarette portions (5) are released; and actuating means (16) for imparting to said cigarette portion holder elements (10) a relative movement, with respect to each other, along said second axis (12) and with a given second law of motion; and being **characterized by** comprising adjusting means (31) for adjusting the timing of said second law of motion with respect to said first law of motion about said first axis (9).

2. A parting drum as claimed in Claim 1, **characterized in that** said actuating means (16) comprise cam means (17) extending about said first axis (9) and connected to at least one said cigarette portion holder element (10); said adjusting means (31) being associated with said cam means (17) to adjust the angular position of the cam means about the first axis (9).

3. A parting drum as claimed in Claim 1 or 2, **characterized in that** said actuating means (16) comprise a cam drum (17) coaxial with said first axis (9) and having at least one annular cam (18) formed on said cam drum (17) and extending about the first axis (9), and a tappet (19) connected to said annular cam (18) and carried by a respective said cigarette portion holder element (10); said adjusting means (31) being means for adjusting an angular position of said cam drum (17) about said first axis (9) and with respect to said pickup station (3) and said release station (7).

4. A parting drum as claimed in Claim 3, **characterized in that** said adjusting means (31) comprise releasable locking means (36) for selectively locking said cam drum (17) in any given said angular position.

5. A parting drum as claimed in Claim 3 or 4, **characterized in that** said annular cam (18) comprises a diverging portion (22) and a converging portion (23) respectively diverging and converging with respect to a reference plane (11) perpendicular to said first axis (9); said adjusting means (31) adjusting a position of said pickup station (3) along said diverging portion (22).

6. A parting drum as claimed in Claim 5, **characterized in that** said diverging portion (22) extends between a point at a minimum distance and a point at a maximum distance from said reference plane (11), and is subtended by a center angle, with the vertex at said first axis (9), substantially equal to a center angle with the vertex at said first axis (9) and extending between said pickup station (3) and said release station (7).

7. A parting drum as claimed in Claim 6, **characterized in that** said adjusting means (31) adjust the position of said pickup station (3) between said point at a minimum distance and an intermediate point of said diverging portion (22).

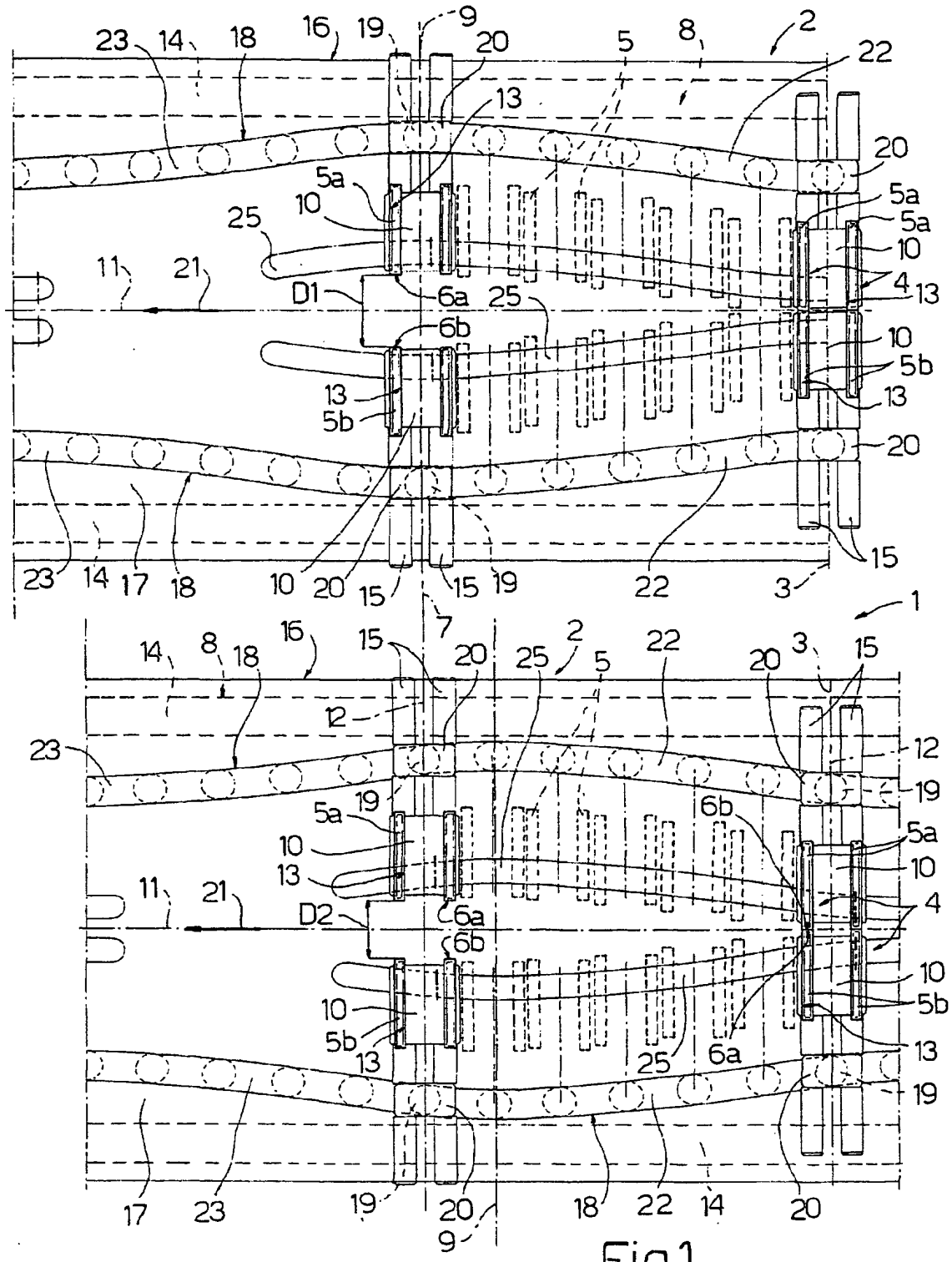

Fig.1

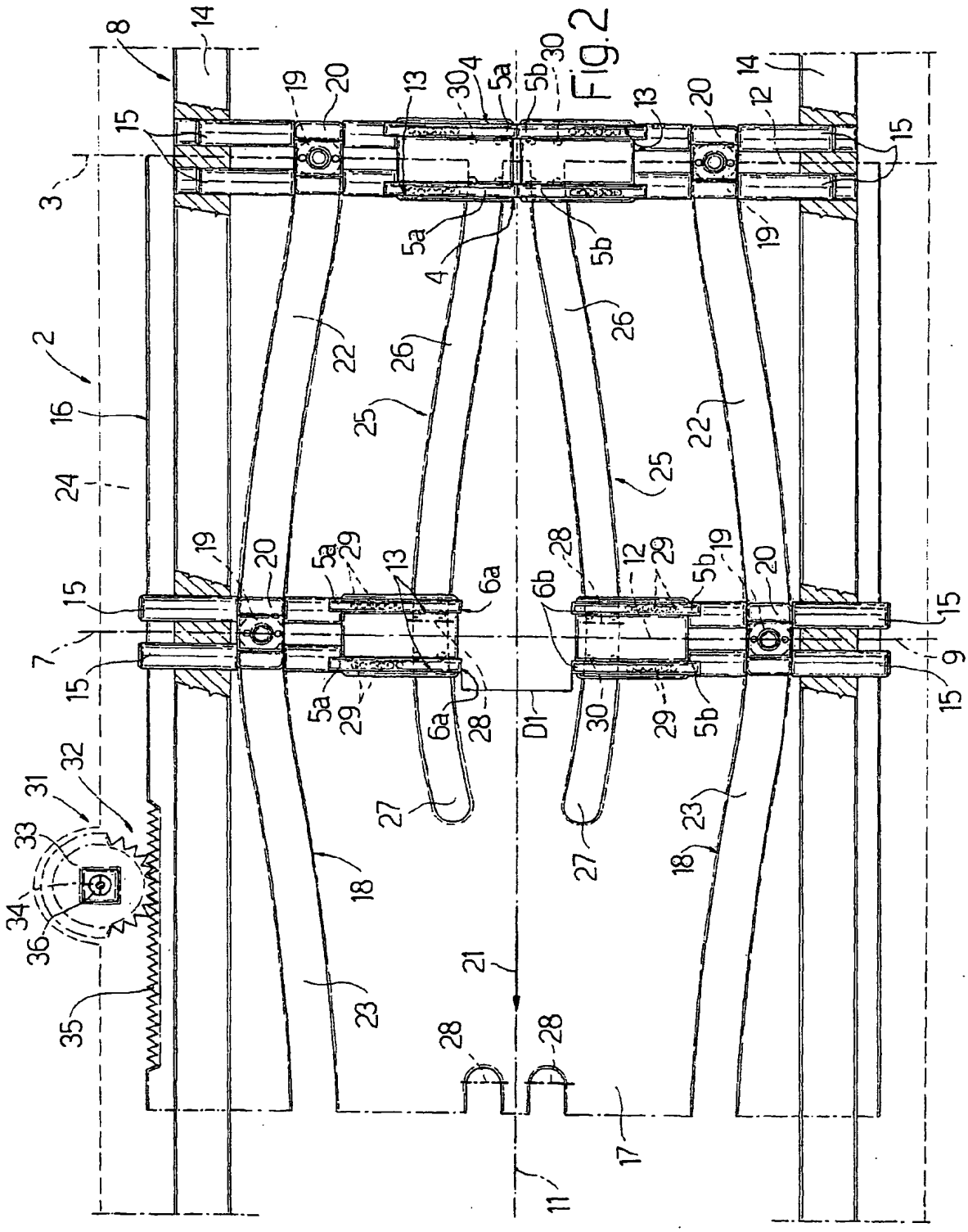

Fig.2

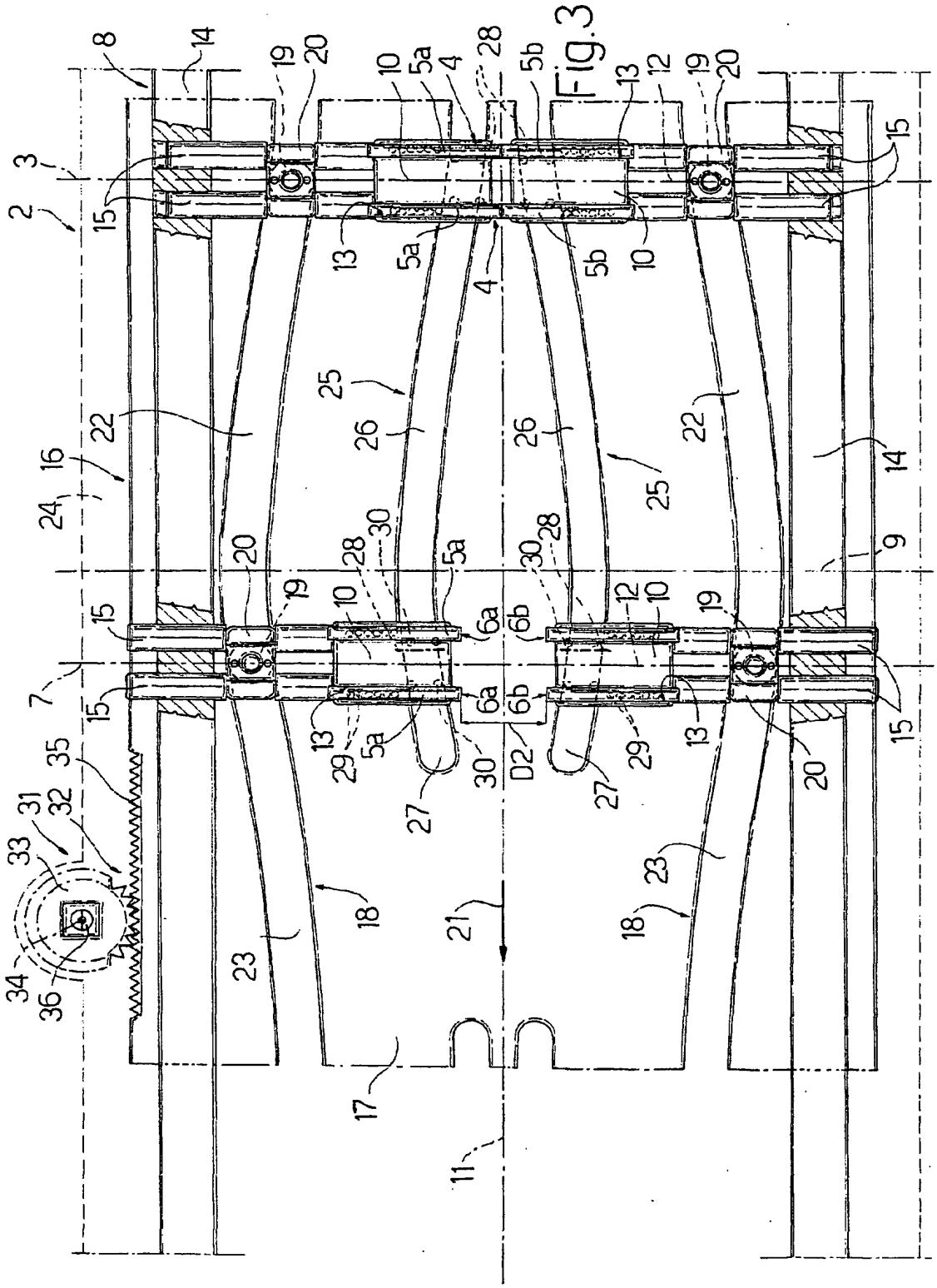

Fig.3

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EUROPEAN SEARCH REPORT

Application Number
EP 01 10 7290

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TECHNICAL FIELDS SEARCHED (Int.Cl.7)

A24C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	4 July 2001	Riegel, R

CATEGORY OF CITED DOCUMENTS

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